Fed. Std. No. 313B
April 14, 1983
(Superseding Fed. Std. No. 313A June 4, 1976)

Federal Standard

Material Safety Data Sheets Preparation and the Submission Of

This standard was approved by the Assistant Administrator

General Services Administration
Office of Federal Supply and Services

FSC MISC

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1. Scope and Purpose

1.1 The requirements established herein provide a uniform system for the preparation and submission of Material Safety Data Sheets (MSDS) to designated Government activities. The data sheets, Occupational Safety and Health Administration (OSHA) Form 20[1/] or Alternate Form A,[2/] or one essentially similar approved by GSA, must be prepared for all hazardous materials as defined in appendix A (Section 10.1.3). The MSDS will be used in connection with Safety and Health programs required by 29 CFR, transportation programs required by 49 CFR and Environmental Protection programs required by 40 CFR.

2. APPLICABLE DOCUMENTS (See appendix B, paragraph 20.1.1.)

3. Application

3.1 Government agencies shall reference this standard in commodity specifications, purchase descriptions, purchase orders, contracts, and other purchase documents to assure inclusion of adequate requirements and clear instructions to contractors for the preparation and submission of Material Safety Data Sheets.

4. Data Submission

4.1 Data submission criteria are furnished in appendix A and instructions for completing and submitting the MSDS are furnished in appendix B, using Alternate Form A as an example. When data have been submitted for a particular item, no change in formulation affecting its hazardous characteristics is permitted without prior approval by the Contracting Officer. Unless there are changes affecting the characteristics, and composition or more recent information about the hazards associated with the item has been identified; only one submission is required, unless otherwise specified in the contract. MSDS shall be submitted to the address specified in the contract. In addition, a copy shall be provided to the Military service or Federal department/agency address in 20.5 of the same service or agency that purchased the item. The reference data specified in 5.1 must be on the MSDS.

1/NOTE: OSHA Form 20 is the required form for submission for those operations where the USDL Safety and Health Regulations for Ship Repairing, Shipbuilding, and Shipbreaking (29 CFR 1915, 1916, 1917) apply.

2/NOTE: Alternate Form A is the preferred form for submission to Federal departments and agencies where the provisions of the maritime safety and health regulations do not apply.

Contractors responding to invitations to bid and requests for quotation may either submit additional copies or notify the Contracting Officer of the contract number and date of previous submissions. Data submission by the manufacturer will satisfy data requirements of their distributions, dealers, jobbers, and retailers. Data obtained will be used within the Government as necessary to comply with Safety and Health Regulations promulgated under Public Law 91-596 (29 CFR) and to provide information necessary to assure safe handling, storage, use, transportation and environmentally acceptable disposal of hazardous materials by Government activities through positive control over hazardous characteristics of material used.

5. Other Data

5.1 Reference Data. All data submissions shall be legible and shall identify: Contract number; part number, trade name, complete noun nomenclature (i.e., the way the manufacturer normally identifies his product); national stock number (NSN) or local stock number/ activity control number of the product; and, where applicable, specification reference including specification number, type, grade, and class.

6. Changes

6.1 When a Federal agency considers that this standard does not provide for its essential needs, a statement citing inadequacies shall be sent in duplicate to the General Services Administration, Federal Supply and Services, Office of Procurement, Commodity Management Division, Packaging and Packing Branch, Washington, DC 20406. The Administration will determine the appropriate action to be taken and will notify the submitting agency. Military activities shall submit comments to the Preparing Activity via the appropriate Departmental custodian and the Military Coordinating Activity.

APPENDIX A

10. SCOPE

10.1 This appendix covers criteria for identification and certification of hazardous materials.

10.1.1 Hazardous material identification and certification guide.

10.1.2 General. Hazardous material identification data are required for all material which, by virtue of its potentially dangerous nature, requires controls to assure adequate safety to life and property. Hazardous materials are found in many Federal Supply Classes and, for classes not addressed in 10.1.4, an MSDS must be furnished for any material that in the judgment of the contractor or the Government agency meets the criteria in 10.1.3.

10.1.3 Hazardous material. For the purpose of preparing the MSDS, a hazardous material is defined as a material having one or more of the following characteristics: (a) has a flashpoint below 200°F (93°C) closed cup, or is subject to spontaneous heating or is subject to polymerization with release of large amounts of energy when handled, stored, and shipped without adequate control; (b) has a Threshold Limit Value^{R} equal to or below 1,000 ppm for gases and vapors, below 500 mg/m^3 for fumes, and equal to or less than 30 mppcf or 10 mg/m^3 for dusts (less than or equal to 2.0 fibers/cc greater than 5 micrometers in length for fibrous materials); (c) a single oral dose that will cause 50 percent fatalities to test animals when administered in doses of less than 500 mg per kilogram of test animal weights; (d) is a flammable solid as defined in 49 CFR 173.150, or is an oxidizer as defined in 49 CFR 173.151, or is a strong oxidizing or reducing agent with a half cell potential in acid solution of greater than $\pm$1.0 volt as specified in Latimer's table on the oxidation-reduction potential; (e) causes first-degree burns to skin in short-time exposure, or is systemically toxic by skin contact; (f) in the course of normal operations, may produce dusts, gases, fumes, vapors, mists, or smokes with one or more of the above characteristics; (g) produces sensitizing or irritating effects; (h) is radioactive; (i) the item has special characteristics which in the opinion of the manufacturer could cause harm to personnel if used or stored improperly; (j) the item is hazardous in accordance with 29 CFR, part 1910; (k) the item is hazardous in accordance with 49 CFR, parts 171-179 or the International Maritime Dangerous Goods Code of the Inter-Governmental Maritime Consultative Organization (IMCO) or the Dangerous Goods Regulations of the International Air Transport Association (IATA); or (l) is regulated by the Environmental Protection Agency under 40 CFR.

10.1.4 Federal Supply Class Criteria. It is important to know if a specific item in a Federal Supply Class (FSC) composed predominantly of hazardous items is not hazardous or has not been identified. To assure positive and complete identification in these classes, a certified Material Safety Data Sheet (preferably Optional Form A)[3/] is required for each item in the FSC's in Table I. If an item included in Table I is not hazardous, the contractor need only provide the information in section 1 of the MSDS and a certification that his item is not hazardous within the criteria of 10.1.3. Identification and certification shall also be required for items that would ordinarily be cataloged under one of the classes in Table 1, but are cataloged in another class because of their specific use or included as parts of another item or kit. Table II lists classes in which only items having hazardous characteristics need be identified and certified.

3/ NOTE: Refer to Notes 1 and 2 on page 1.

TABLE I. FEDERAL SUPPLY CLASSES (FSC) IN WHICH ALL ITEMS MUST BE IDENTIFIED AND CERTIFIED.

FSC	TITLE
6810	Chemicals
6820	Dyes
6830	Gases: Compressed and Liquefied
6840	Pest Control Agents and Disinfectants
6850	Miscellaneous Chemical Specialities
7930	Cleaning and Polishing Compounds and Preparations
8010	Paints, Dopes, Varnishes, and Related Products
8030	Preservative and Sealing Compounds
8040	Adhesives
Group 91	(PACKAGED PRODUCTS ONLY)
9110	Fuels, Solid
9130	Liquid Propellants and Fuels, Petroleum Base
9135	Liquid Propellant Fuels and Oxidizers, Chemical Base
9140	Fuel Oils
9150	Oils and Greases: Cutting, Lubricating, and Hydraulic
9160	Miscellaneous Waxes, Oils and Fats

TABLE II. FEDERAL SUPPLY CLASSES (FSC) IN WHICH ONLY HAZARDOUS ITEMS NEED TO BE IDENTIFIED.

If an item is determined to be hazardous as defined in section 10.1.3 of this standard, an MSDS should be submitted even though the Federal Supply Class is not listed in this table.

FSC	TITLE	EXAMPLES OF HAZARDOUS ITEMS REQUIRING IDENTIFICATION
1370	Pyrotechnics	Warning fusee, fire starter
1375	Demolition	Explosive device Materials
2520	Vehicular Power	Items containing asbestos Transmission Components
2530	Vehicular Brake	Items containing asbestos Steering, Axle, Wheel, and Track Components
2540	Vehicular	Items containing asbestos Furniture and Accessories

TABLE II. FEDERAL SUPPLY CLASSES (FSC) IN WHICH ONLY HAZARDOUS ITEMS NEED TO BE IDENTIFIED. (Con.)

FSC	TITLE	EXAMPLES OF HAZARDOUS ITEMS REQUIRING IDENTIFICATION
2640	Tire Rebuilding , and Tire and Tube Repair Materials	Only items containing flammable or toxic compounds
3433	Gas Welding, Heat Cutting, and Metalizing Equipment	Compressed gases
3439	Miscellaneous Welding, Soldering, and Brazing Supplies and Accessories	Only hazardous items such as cleaners, acids, flux and supplies containing or producing hazardous fumes
3610	Printing, Duplicating, and Bookbinding Equip.	Flammable or toxic lithographic solutions
3655	Gas Generating and Dispensing Systems, Fixed or Mobile	Only those items producing hazardous fumes
3680	Foundry Machinery, Related Equipment and Supplies	Flammable or toxic casting compounds
4240	Safety and Rescue Equipment	Those items that release oxygen, or contain compressed gases or initiating charges
5610	Mineral Construction Materials, Bulk	Hazardous items such as cutback asphalt, deck and floor covering, deck and surface underlay compounds, sealing compounds, flight deck compounds
5640	Wallboard Building Paper, and Thermal Insulation Materials	Asbestos cloth having loose fibers or flyings that may become airborne, and materials containing formaldehyde
5820	Radio and Television Communication Equipment, except Airborne	Those circuit cooler items containing gases that are regulated as hazardous to the earth's ozone layer

TABLE II. FEDERAL SUPPLY CLASSES (FSC) IN WHICH ONLY HAZARDOUS ITEMS NEED TO BE IDENTIFIED. (Con.)

FSC	TITLE	EXAMPLES OF HAZARDOUS ITEMS REQUIRING IDENTIFICATION
5835	Sound Recording and Reproducing Equipment	Those recording tape cleaners containing hazardous cleaning fluids or packaged in pressured containers
5910	Capacitors	Those items containing Polychlorinated Biphenyls (PCBs)
5915	Filters and Networks	Those items containing Polychlorinated Biphenyls (PCBs)
5920	Fuses and Lightning Arresters	Those items containing radioactive materials
5925	Circuit Breakers	Those items containing radioactive materials
5930	Switches	Those containing radioactive materials
5935	Connectors, Electrical	Those kits containing flammable chemicals
5950	Coils and Transformers	Those items containing Polychlorinated Biphenyls (PCBs)
5960	Electron Tubes and Associated Hardware	Those tubes containing radioactive isotopes and requiring warning labels and magnetron tubes that require special precautions when being prepared for air shipment
5965	Headsets, Handsets, Microphones, and Speakers	Those items containing magnetic materials
5970	Electrical Insulators and Insulating Materials	Those items containing flammable solvents
5975	Electrical Hardware and Supplies	Those items containing asbestos
5985	Antennas, Waveguide, and Related Equipment	Those kits containing flammable chemicals

TABLE II. FEDERAL SUPPLY CLASSES (FSC) IN WHICH ONLY HAZARDOUS ITEMS NEED TO BE IDENTIFIED. (Con.)

FSC	TITLE	EXAMPLES OF HAZARDOUS ITEMS REQUIRING IDENTIFICATION
5999	Miscellaneous Electrical and Oxide Electronic, Components	Those contact plates containing beryllium
6135	Batteries, Primary	Lead-acid, lithium and mercury batteries and alkaline (with electrolyte)
6140	Batteries, Secondary	Those wet or moist items containing corrosive or other hazardous compounds
6220	Electric Vehicular Lights and Fixtures	Those items containing mercury
6230	Electric Portable and Hand Lighting Equipment	Those items containing wet batteries
6240	Electric Lamps	Those items containing mercury
6260	Nonelectrical Lighting Fixtures	Those items containing mercury
6350	Miscellaneous Alarm, Signal, and Security Detection Systems	Those items containing wet batteries or radioactive materials
6505	Drugs, Biologicals, and Official Reagents	Only hazardous items as defined in paragraph 10.1.3
6508	Medicated Cosmetics and Toiletries	Only hazardous items as defined in paragraph 10.1.3
6510	Surgical Dressing Materials	Only items containing flammable solvents
6520	Dental Instruments, Equipment, and Supplies	Only items containing flammable solvents, mercury or asbestos
6525	X-Ray Equipment and Supplies: Medical, Dental, Veterinary	Only items containing hazardous chemicals, solvents

TABLE II. FEDERAL SUPPLY CLASSES (FSC) IN WHICH ONLY HAZARDOUS ITEMS NEED TO BE IDENTIFIED. (Con.)

FSC	TITLE	EXAMPLES OF HAZARDOUS ITEMS REQUIRING IDENTIFICATION
6625	Electrical and Electronic Properties Measuring and Testing Instruments	Those items containing radioactive materials
6640	Laboratory Equipment and Supplies	Only items containing flammable compounds, mercury or asbestos
6685	Pressure, Temperature, and Humidity Measuring and Controlling Instruments	Items containing mercury or compressed gases
6740	Photographic Developing and Finishing Equipment	Those items containing radioactive compounds
6750	Photographic Supplies	Only items containing hazardous chemicals, solvents, thinners and cements
6780	Photographic Sets, Kits, and Outfits	Only items containing hazardous chemicals, solvents, thinners and cements
7360	Sets, Kits, and Outfits: Food Preparation and Serving	Those items containing compressed gases such as fire extinguishers
7510	Office Supplies	Only hazardous items such as solvents, thinners, cleaning fluids, flammable inks and varnishes
8405	Outerwear, Men's	Those maintenance kits containing flammable solvents
8410	Outerwear, Women's	Those maintenance kits containing flammable solvents
8415	Clothing, Special Purpose	Those maintenance kits containing flammable solvents
8465	Individual Equipment	Those maintenance kits containing flammable solvents
8510	Perfumes, Toilet Preparations, and Powders	Shipping containers, and pressurized containers with flammable or nonflammable propellants

TABLE II. FEDERAL SUPPLY CLASSES (FSC) IN WHICH ONLY HAZARDOUS ITEMS NEED TO BE IDENTIFIED. (Con.)

FSC	TITLE	EXAMPLES OF HAZARDOUS ITEMS REQUIRING IDENTIFICATION
8520	Toilet Soap, Shaving Prepara-, tions, and Dentrifices	Shipping containers, pressurized containers with flammable or nonflammable propellants
8720	Fertilizers	Only items containing weed and pest controls or other harmful ingredients, or items that are hazardous because of their composition
9390	Miscellaneous Fabricated Non-metallic Materials	Those items containing flammable solvents or asbestos
9920	Smokers' Articles and Matches	Lighter fuel and matches only
9930	Memorials; Cemeterial and Mortuary Equipment and Supplies	Those items containing formaldehyde or its solutions

APPENDIX B

20. SCOPE

20.1 This appendix covers instructions for preparation and submission of Material Safety Data Sheets (MSDS).

20.1.1 The following documents form a part of this standard to the extent specified herein. Unless otherwise indicated, the issues in effect on date of invitation for bids or requests for proposal shall apply.

20.1.1.1 Governmental

29 CFR, Occupational Safety and Health Standards, parts 1910, 1915, 1916, 1917, 1960, Occupational Safety and Health Administration.

40 CFR, Environmental Protection Agency (EPA).

49 CFR, Transportation, parts 100-199, Department of Transportation (DOT).

Preparation of Hazardous Materials for Military Air Shipment, AFR 71-4, TM 38-250, NAVSUP PUB 505, MCO P 430.19, DLAM 4145.3, Air Force Logistics Command, Wright Patterson AFB, OH 45433.

Registry of Toxic Effects of Chemical Substances, National Institute for Occupational Safety and Health, Center for Disease Control, Cincinnati, OH 45226.

20.1.1.2 Non-Governmental

Dangerous Goods Regulations, International Air Transport Association (latest edition).

International Maritime Dangerous Goods code, Inter-Governmental Maritime Consultative Organization, volumes 1 through 4 (latest edition).

International Union of Pure and Applied Chemistry (IUPAC), Commission on Nomenclature (latest convention). Rules published in "Journal of Pure and Applied Chemistry."

Restricted Articles Tariff 6D (C.A.B. 82), Airline Tariff Publishing Co., Dulles International Airport, P.O. Box 17415, Washington, DC 20041.

TLVs® Threshold Limit Values for Chemical Substances and Physical Agents in the Workroom Environment (latest annual edition) by The American Conference of Governmental Industrial Hygienists (ACGIH) (application for copies should be addressed to American Conference of Governmental Industrial Hygienists, P.O. Box 1937, Cincinnati, OH 45201).

20.2 Material Safety Data Sheet (MSDS) Forms

20.2.1 Occupational Safety and Health Administration (OSHA) Form 20 or Alternate Form A (see figure 1 or 2), or one essentially similar, approved by GSA, is required

to be filled out on all hazardous materials as defined in section 10.1.3. Only one of the two forms shown need be filled out. The Alternate Form A (figure 2) is the preferred form for submission to Federal departments and agencies except when provisions of the maritime safety and health regulations apply.

NOTE: For both the OSHA 20 and Alternate Form A when a number less than 1.0 is given, a 0 should be entered to the left of the decimal (e.g., 0.895 instead of .895). This is essential for the prevention of clerical errors.

20.3 Instructions. The data elements identified below by the notation (4/) are unique to Alternate Form A (figure 2). The information in these elements are required by Federal departments and agencies in connection with various hazardous material regulations. Elements that are common to both forms are not highlighted.

20.3.1 Instructions for Section I - GENERAL INFORMATION. This information is essential to properly associate the information provided on this sheet with the actual item supplied to the Government.

20.3.1.1 Type of Data Sheet: New or Revised Alternate Form A/Section Changed. 4/ This section is used to specify by filling in the appropriate block, if this Alternate Form A is new or if it is revised. Also, the preparer should indicate which sections were revised.

20.3.1.2 Manufacturer's Name. The name under which the company does business. Include any divisions if applicable.

20.3.1.3 Federal Supply Code for Manufacturers/Non-Manufacturers (FSCM/FSCNM). 4/ The 5-position code assigned to any contractor who does business with the Government. The code is assigned by the Defense Logistics Service Center, Battle Creek, MI.

20.3.1.4 Contract/Order Number. 4/ The contract number assigned by the specific Government agency procuring the item. The entire contract number including the branch designator (e.g., GSA, DLA) shall be given.

20.3.1.5 Manufacturer's Address. Mailing address, including zip code.

20.3.1.6 Part Number/Product/Trade Name. This is the name or formula number that the manufacturer uses to identify his product.

20.3.1.7 National Stock Number/Activity Control Number/Local Stock Number (NSN/ACN/LSN). 4/ The NSN is the 13 digit identification number assigned by the Federal Cataloging System. The ACN or LSN is any stock number that is locally assigned by an individual Government activity to identify an item when an NSN is not used. The NSN or the ACN/LSN are referenced in the contract and must be placed on the MSDS for complete identification purposes.

20.3.1.8 Certification Block. 4/ This is a block for the preparer of the MSDS to indicate that the item is or is not hazardous as defined in section 10.1.3 or 10.1.4. If the item is not hazardous it will not be necessary to complete sections II through X.

20.3.1.9 Specification.4/ This is the basic specification or standard under which an item is bought.

20.3.1.10 Type, Grade, Class.4/ This is the type, grade or class (as applicable) for the specification referenced in 20.3.1.9.

20.3.1.11 NRC License Number.4/ This is the number of the license granted by the Nuclear Regulatory Commission to the manufacturer of the item.

20.3.1.12 EPA Registration Number.4/ This is the number granted by the Environmental Protection Agency for the item.

20.3.1.13 Chemical Name and Synonyms. This is the chemical name of the item. All known synonyms are required in this field.

20.3.1.14 Chemical Family. This is the generic name of the chemical family of the item, such as "acid" or "ketone."

20.3.1.15 Formula. Refers only to the chemical formula for single elements and compounds, not to the formulation of a mixture. Example: $C_2H_5COCH_3$.

20.3.1.16 Company Point of Contract.4/ The name of the individual, title, telephone number, extension (if different from emergency number) who prepared the OSHA Form 20A and is responsible for its contents.

20.3.1.17 Signature Block.4/ The preparer will sign this block to certify that the item is or is not hazardous as indicated in 20.3.1.8 and the information given in the MSDS is, to the best of his knowledge, correct.

20.3.1.18 Emergency Telephone Number. Show area code, telephone number(s) and extension(s) and hours of operation so further information may be obtained in the event of an emergency involving the material. List emergency after hours telephone number(s) if possible.

20.3.1.19 Date.4/ This is the latest date the MSDS was prepared, reviewed, and/or revised. (NOTE: This is not necessarily the date the MSDS was furnished to the Government.)

20.3.2 Instructions for Section II - COMPOSITION

Discussion. List all chemicals, by specific chemical name, which cause, or could potentially cause, the material to meet the definition of a hazardous material in paragraph 10.1.3. It is important to list all ingredients that could have an effect because of the possible synergistic effects of the different chemicals in the mixture. In addition, the toxicological effects of chemicals are under constant re-evaluation. Thus, relatively innocuous chemicals can have an impact on the hazardous properties of a product.

20.3.2.1 NIOSH Identification Number.4/ This is the accession or identification number referenced in the Registry of Toxic Effects of Chemical Substances. It is used to precisely identify the chemical in the mixture. It must be given whenever a chemical ingredient is given. Leave this field blank only when an accession number has not been assigned by NIOSH. (Refer to 20.1.1.1 for the specific publication name.)

20.3.2.2 Ingredients. Place the precise chemical name and formula for each ingredient in this field. The specific chemical name for an ingredient should follow the nomenclature convention used by the International Union of Pure and Applied Chemistry (IUPAC). Do not use general terms such as "acids" or "gases." Knowledge of the exact nature of the chemical is very important in determining emergency response procedures. For radioactive materials the radionuclide and the activity per item will be entered here. For those items where it is appropriate, such as paints or preservatives, a term such as pigment, catalyst, vehicle or solvent, etc. (as shown in figure 1), should be stated after the chemical name of each ingredient.

20.3.2.2.1 Radioactivity.[4/] The quantity of radioactive material present in the item. Specify the units of measurement such as CI for curies or UCI for microcuries.

20.3.2.2.2 Form.[4/] Specify if the radioactive material is in a normal or special form as defined in 49 CFR 173.389(d) or 173.389(g). Also specify the physical state of the radioactive material as gas, liquid or solid. Specify the data as follows:

Normal - Solid
Normal - Liquid
Normal - Gas
Special - Solid
Special - Liquid
Special - Gas

20.3.2.3 Percentage. The approximate percentage of each ingredient by weight or volume (specify) shall be shown to the nearest 5 percent. The percentages of any substance constituting less than 5 percent may be indicated as such. For mixtures, such as filler metals and their coatings and core fluxes in which the ingredients constitute very small proportions of the mixture, the ingredients shall be stated to the nearest 0.5 percent, and ingredients constituting less than 0.5 percent may be indicated as such.

20.3.2.4 Threshold Limit Value (Individual Ingredients). The Threshold Limit Value (TLV^R) for each ingredient listed will be entered in the column provided. The TLV^R refers to the current values promulgated by the American Conference of Governmental Industrial Hygienists. The TLV^R for single elements and compounds shall be entered here. Express these values in millions of particles per cubic foot of air (mppcf) or in milligrams of particulate per cubic meter of air (mg/m^3) for dust; in milligrams of particulate per cubic meter of air (mg/m^3) for mists and fumes; or in parts per million parts of air by volume (ppm) for gases and vapors. Values for asbestos or other fibrous material shall be expressed in fibers (greater than 5 micrometers in length) per cubic centimeter of air (f/cc). State the unit in which the TLV^R is expressed. NOTE: This TLV^R is for each ingredient.

20.3.3 Instructions for Section III - PHYSICAL PROPERTIES

20.3.3.1 Boiling Point. State the temperature at which the liquids boil, in degrees F and C, at a pressure of 760 mmHg. For mixtures, a boiling range is acceptable.

20.3.3.2 Critical Temperature (Degrees F or C).[4/] The maximum temperature at which a gas can be liquefied. Above the critical temperature the substance will remain in the gaseous state regardless of the pressure applied.

20.3.3.3 Solubility in Water. Use the following terms to describe the solubility of the product by weight in distilled water at 68°F (20°C):

Negligible	Less than 0.1 percent
Slight	0.1 - 1 percent
Moderate	1 - 10 percent
Appreciable	more than 10 percent
Complete	in all proportions

Also the exact percentage may be used in lieu of the above terms.

20.3.3.4 Specific Gravity. State the ratio of weight of a volume of material to the weight of an equal volume of water at 68°F (20°C). This determines whether the material floats or sinks in water.

NOTE: (Refer to 20.3.3.3 and 20.3.3.4 above only.) Although the measurements are specified and required at 68°F (20°C), if the data are only available at another temperature specify the temperature at which the measurement was taken.

20.3.3.5 Viscosity.4/ The internal resistance to flow exhibited by a fluid. The units of measurement and applicable temperature in degrees F and C should be expressed.

20.3.3.6 Autoignition Temperature.4/ The minimum temperature required to initiate or cause self-sustained combustion in any substance in the absence of a spark or flame. The temperature should be expressed in degrees F and C.

20.3.3.7 Evaporation Rate. State the ratio of the evaporation rate to that of either butyl acetate or diethyl ether. Insert the name of whichever is used.

20.3.3.8 Vapor Pressure. The pressure (usually expressed in millimeters of mercury) characteristic at 68°F (20°C) of vapor in equilibrium with its liquid or solid form.

20.3.3.9 Critical Pressure.4/ The pressure required to liquefy a gas at its critical temperature. Specify units.

20.3.3.10 Decomposition Temperature.4/ The temperature (°F and °C) at which the material transforms into one or more other substances by heating, burning, etc. This datum element is used in conjunction with the hazardous decomposition products that are specified in 20.3.6.4.

20.3.3.11 Percentage Volatile by Volume. State the percentage of the liquid or solid by volume that evaporates at the ambient temperature of 68°F (20°C). This also applies to solids such as naphthalene.

NOTE: (For 20.3.3.11) Although the measurements are specified and required at 68°F (20°C), if the data are only available at another temperature specify the temperature at which the measurement was taken.

20.3.3.12 Corrosion Rate.4/ An indication should be given as to whether or not the material is corrosive to metals. Give the corrosion rate in inches per year and specify the temperature at which the rate is applicable and the material on which the test was performed. (Refer to 49 CFR 173.240 for specific temperature and materials.)

20.3.3.13 Vapor Density. State the relative density or weight of a vapor or gas (with no air present) compared with an equal volume of air. Specify the temperature (°F or °C) at which the vapor density is determined.

20.3.3.14 pH.4/ The value used to represent the acidity or alkalinity of an aqueous solution. It is defined as the natural logarithm of the reciprocal of the hydrogen ion concentration of a solution.

20.3.3.15 Freezing (Melting) Point.4/ The temperature of an item at which its crystals are in equilibrium with the liquid phase at atmospheric pressure. The terms "melting point" and "freezing point" are used interchangeably. The temperature should be expressed in degrees F and C.

20.3.3.16 Magnetism.4/ Defined as a material with a magnetic field strength of 0.002 gauss or more at a distance of 7 feet from any point on the package surface, or is of such mass that it could affect navigational instruments. Data should be given in milligauss.

20.3.3.17 Appearance and Odor. Give a brief description of the physical appearance and characteristic odor. Example: viscous, colorless, liquid with smell of rotten eggs.)

20.3.4 Instructions for Section IV - FIRE AND EXPLOSION HAZARD DATA

20.3.4.1 Flashpoint. State the temperature (°F and °C), and the test method used, at which a liquid will give off enough flammable vapor to ignite when tested by the closed cup (CC) method. When multi-component paint systems are used and mixed in the field, the flashpoint of the individual components shall be noted. The open cup (OC) temperature may be given only when the CC temperature is not available.

20.3.4.2 Flammable (Explosive) Limits. State the range of gas or vapor concentrates (percent by volume in air) that will burn or explode if an ignition source is present. LEL means the lower explosive limit, and UEL means the upper explosive limit. Knowledge of the LEL will aid in determining the volume of ventilation needed for an enclosed space to prevent fires and explosions.

20.3.4.3 Extinguishing Media. List the firefighting media suitable for use on the burning material. For certain specific chemicals, special formulations, in addition to the standard agents, are available for extinguishing fires. These should be indicated by generic name. The standard firefighting agents are: water fog, foam, alcohol foam, CO_2, and dry chemical.

20.3.4.4 Special Firefighting Procedures and Equipment. If water is unsuitable, specify the firefighting procedure to be used. Also list any necessary personal protective equipment needed.

20.3.4.5 Unusual Fire and Explosion Hazards. Specify such hazards and special conditions that govern them. For example, indicate if the product is under pressure and may explode if exposed to fire.

20.3.5 Instruction for Section V - HEALTH HAZARD DATA

20.3.5.1 Threshold Limit Value. See figure one (1) and 20.3.2.4.

20.3.5.2 Effects of (Acute and Chronic) Overexposure. List the symptoms that an individual would experience as a result of the overexposure. Examples include nausea, headache, vomiting, shortness of breath, gastrointestinal pain, dermatitis, diarrhea, dizziness, loss of appetite, etc. This list of symptoms is not all inclusive. Specify if the symptoms are the result of skin contact, ingestion or inhalation. Also state if the item can potentially cause cancer.

20.3.5.3 Emergency and First-Aid Procedures. State the emergency procedures to be followed upon overexposure to the item. Inhalation, skin or eye contact and oral ingestion should be considered in recommending first-aid procedures.

20.3.6 Instructions for Section VI - REACTIVITY DATA

20.3.6.1 Stability. Indicate by cross or check whether stable or unstable under reasonably forseeable conditions of storage, use or misuse.

20.3.6.2 Conditions to Avoid (Stability). If unstable, list those conditions that may cause a dangerous reaction. Examples: shock from dropping, temperature above 150°F (65°C), etc.

20.3.6.3 Incompatibility (Materials to Avoid). Provide information on such common materials and contaminants with which the product may reasonably come into contact, to produce a reaction that would release large amounts of energy. If none is known, so state. State whether the material to be avoided is an oxidizing material, acid, caustic alkali or corrosive. Identify container materials that will react and therefore must not be used.

20.3.6.4 Hazardous Decomposition Products. List hazardous materials produced in dangerous amounts by burning, oxidation, or heating in welding or burning. Thermal decomposition products such as CO, CO_2, and hydrochloric acid from vinyl chloride plastics serve as examples. Also specify any hazardous products formed as a result of aging. An example is ether, which can decompose into peroxides with age. Any special handling or storage precautions to be taken to avoid the above-mentioned hazards should be specified in the Handling and Storage Precautions section 20.3.9.1.

20.3.6.5 Hazardous Polymerization. Hazardous polymerization is that which takes place at a rate that releases large amounts of energy. Indicate by check or cross whether or not hazardous polymerization can occur.

20.3.6.6 Conditions to Avoid (Polymerization). If hazardous polymerization can occur, list those reasonably forseeable storage conditions that would start polymerization. Include the expected time period in which the inhibitors may be used up.

20.3.7 Instructions for Section VII - SPILL OR LEAK PROCEDURES

20.3.7.1 Steps To Be Taken in Case Material is Released or Spilled. This field addresses what should be done on a emergency basis to control the spill or leak. These procedures could include any applicable precautions for the avoidance of

breathing gases and vapors; contact with liquids and solids; removing sources of ignition; and special equipment and personal protective equipment required for cleaning up, such as glass or plastic scoops and respiratory devices.

20.3.7.2 Waste Handling and Disposal Method. This field addresses what should be done with the spilled material and the material that was used to control the spill or leak and has become contaminated. It includes instructions on what steps are necessary to containerize the product and to get it into a non-emergency status. It is generally not intended for long-range ultimate disposal methodology because such instructions are often long and complex and should be addressed in a separate format. If long-range ultimate disposal methodology is known, provide as a separate attachment. All disposal procedures must comply with local, state and Federal regulations.

20.3.7.3 Neutralizing Agent.[4/] This is the safest, most effective material that can be used to neutralize corrosive materials and others.

20.3.8 Instructions for Section VIII - OCCUPATIONAL PROTECTIVE MEASURES

20.3.8.1 Respiratory Protection. Refers to the personal protective equipment used to protect the wearer from inhalation of a contaminated atmosphere. Examples are chemical cartridge respirators, dust respirators, self-contained breathing apparatus, etc.

20.3.8.2 Ventilation. The basic ventilation methods are dilution or general ventilation and local exhaust. Dilution or general ventilation consists of general ventilation of a workroom so designed that the contaminants released into the atmosphere are continuously diluted by the introduction of uncontaminated air to levels at which a worker can safely work for 8 hours a day. It is usually applied to the control of low-toxicity contaminants. A local exhaust system is used to carry off an air contaminant by trapping it near its source. Specify the type of ventilation and any specific equipment necessary to accomplish this.

20.3.8.3 Protective Gloves. These are gloves that are used to protect personnel against the handling of corrosive and/or toxic materials such as acids or other hazardous materials that can leave a deteriorating effect on the human skin/body tissue by skin absorption. The material of the gloves is suitable to the exposure from the specific chemical that may be encountered.

20.3.8.4 Eye Protection. The eye protection equipment is used for the protection of the eyes against acid splashes, chipping, welding, and other eye-hazardous jobs. Examples include industrial safety glasses, chemical goggles, full-length face shields, etc.

20.3.8.5 Other Personal Protective Equipment. This is additional equipment that is worn by the worker to prevent exposure or contact with hazardous chemicals. Examples include suits or boots made of natural rubber, neoprene, or vinyl; safety shoes; ear protection; and hardhats.

20.3.9 Instructions for Section IX - SPECIAL PRECAUTIONS

20.3.9.1 Handling and Storage Precautions. This field includes any special precautions to be taken in storage and handling to avoid any reaction hazards. When applicable, indicate safe storage life of product in relation to reactivity.

Specify any storage or handling precautions to be taken to avoid any hazards associated with the aging of the product. Other general precautions to be taken should be included. This section also can be used to identify any special equipment that is required for transfer or storage.

20.3.9.2 Other Precautions. This section includes any unique additional precautions that must be taken for the material.

20.3.10 Instructions for Section X - TRANSPORTATION[4/]

20.3.10.1 Applicable Regulations.[4/] Indicate by cross or check the applicable shipping regulation from which the shipping name, class and label below are taken. This is normally the mode of transportation used to ship the item from the manufacturer/contractor to the customer.

20.3.10.2 Shipping Name.[4/] Indicate the proper shipping name for the material. The shipping name will be from the regulation that is indicated on the MSDS in section 20.3.10.1 above.

20.3.10.3 Identification Number.[4/] Indicate the identification number specified for the above shipping name in 49 CFR 172.101.

20.3.10.4 Reportable Quantity.[4/] Indicate if the item is a reportable quantity (hazardous substance) as defined in 49 CFR 171.8. A "YES" or "NO" entry is sufficient.

20.3.10.5 Hazard Class.[4/] Indicate the hazard class for the material. This class will be from the regulation that is indicated on the MSDS in section 20.3.10.1 above.

20.3.10.6 Labels.[4/] Indicate the label(s) to be placed on the outside shipping container. If labels are not required, indicate "none." This will be from the regulation that is indicated on the MSDS in section 20.3.10.1 above.

20.3.10.7 Unit Container.[4/] This is the container in immediate contact with the product (e.g., 1-pint metal can, 1-gallon polyethylene bottle, 1-pound paper bag, 55-gallon metal drum, 12-ounce aerosol can, etc.). State the material of construction and capacity by weight or volume of the container.

20.3.10.8 DOT Specification Container.[4/] When applicable, give the number of the DOT Specification Container of the unit container (e.g., DOT 2U, DOT 5B etc.).

20.3.10.9 DOT Exemption Number/Department of Defense (DoD) Certification Control Number (CCN).[4/] When applicable, give the DOT Exemption Number or the DoD Certification Control Number under which the product is shipped.

20.3.10.10 Limited Quantity.[4/] Indicate if the item is a limited quantity as defined in 49 CFR 171.8. A "YES" or "NO" entry is sufficient.

20.3.10.11 Aerosol Propellant(s).[4/] When applicable give the chemical name of any aerosol propellants used in the product. This chemical will also appear in the ingredients section (section II) of the MSDS.

20.3.10.12 Net Explosive Weight.[4/] The total weight of all active Class A and B components of an explosive that includes primary explosives, secondary explosives, pyrotechnics, and propellants.

20.4 Submission of Data

20.4.1 Mail complete form as directed in the contract or order. In addition, a copy shall be provided to the Military service or Federal department/agency address in 20.5 of the same service or agency that purchased the item (see 4.1 and 20.5). Assure that the contract or order number, the part number/trade name, the National Stock Number or Local Stock Number/Activity Control Number and, where applicable, the specification reference and the address of the organization making the purchase are included when supplying the form to the appropriate organization in 20.5. This information assists the activities in 20.5 in clarifying data essential to internal Government use.

20.5 Pertinent Government Mailing Addresses for Submission of Data

Army:
Commander
U.S. Army Environmental Hygiene Agency
ATTN: HSE-OI
Aberdeen Proving Ground, MD 21010

Air Force:
USAF Occupational and Environmental
Health Laboratory
ATTN: ECH
Brooks, AFB, TX 78235

GSA:
General Services Administration
Federal Supply and Services
ATTN: Packaging and Packing Branch FCMP
Washington, DC 20406

Marine Corps:
Navy Environmental Health Center
ATTN: HMIS
Bld. X 353, Naval Station
Norfolk, VA 23511

Navy:
Navy Environmental Health Center
ATTN: HMIS
Bldg. X 353, Naval Station
Norfolk, VA 23511

Defense Logistics Agency:
Commander
Defense General Supply Center
ATTN: DGSC-STF
Richmond, VA 23297

Defense Mapping Agency:
Director
Defense Mapping Agency
Building 56, U.S. Naval Observatory
Washington, DC 20305

National Security Agency:	Director National Security Agency Central Security Service ATTN: L542 Ft. George G. Meade, MD 20755
U.S. Coast Guard:	Commandant United States Coast Guard ATTN: G-CSP/61 Washington, DC 20590
Postal Service:	United States Postal Service ATTN: Accident Prevention Division 475 L'Enfant Plaza, S.W. Washington, DC 20260

20.6 Availability of forms.

20.6.1 Forms OSHA-20 and Alternate Form A must be printed, reproduced, or copied locally.

MILITARY INTERESTS:

Military Coordinating Activity

DLA-DH

Custodians

Army - MD
Navy - SA
Air Force - 07

Review Activities

Army - SM
Navy - MS, AS, SH
Air Force - 43

CIVIL AGENCY COORDINATING ACTIVITIES:

GSA-FSS
COMMERCE-CPS
EPA
HHS-NIH, OSHA

PREPARING ACTIVITY:

GSA-FSS

Form Approved
OMB NO 44 R1367

U.S. DEPARTMENT OF LABOR

Occupational Safety and Health Administration

MATERIAL SAFETY DATA SHEET

Require Under USDL Safety and Health Regulations for Ship Repairing, Shipbuilding, and Shipbreaking (29 CFR 1915, 1916, 1917)

SECTION I

MANUFACTURER'S NAME	EMERGENCY TELEPHONE NO
ADDRESS (Number, Street, State, and ZIP Code)	
CHEMICAL NAME AND SYNONYMS	TRADE NAME AND SYNONYMS
CHEMICAL FAMILY	FORMULA

SECTION II — HAZARDOUS INGREDIENTS

PAINTS, PRESERVATIVES & SOLVENTS	%	TLV (Units)	ALLOYS AND METALLIC COATINGS	%	TLV (Units)
PIGMENTS			BASE METAL		
CATALYST			ALLOYS		
VEHICLE			METALLIC COATINGS		
LVENT.			FILLER METAL PLUS COATING OR CORE FLUX		
DDITIVES			OTHERS		
OTHERS					

HAZARDOUS MIXTURES OF OTHERS LIQUIDS, SOLIDS OR GASES	%	TLV (Units)

SECTION III — PHYSICAL DATA

BOILING POINT (°F)		SPECIFIC GRAVITY (H2O = 1)	
VAPOR PRESSURE (mm Hg)		PERCENT, VOLATILE BY VOLUME (%)	
VAPOR DENSITY (AIR = 1)		EVAPORATION RATE (_____ = 1)	
SOLUBILITY IN WATER			
APPEARANCE AND ODOR			

SECTION IV — FIRE AND EXPLOSION HAZARD DATA

ASH POINT (Method Used)	FLAMMABLE LIMITS	Lel	Uel
XTINGUISHING MEDIA			
SPECIAL FIRE FIGHTING PROCEDURES			
UNUSUAL FIRE AND EXPLOSIN HAZARDS			

SECTION V — HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE
EFFECT OF OVEREXPOSURE
EMERGENCY AND FIRST AID PROCEDURES

SECTION VI — REACTIVITY DATA

STABILITY	UNSTABLE		CONDITIONS TO AVOID
	STABLE		
INCOMPATABILITY *(Materials to avoid)*			
HAZARDOUS DECOMPOSITION PRODUCTS			
HAZARDOUS POLYMERIZATION	MAY OCCUR		CONDITIONS TO AVOID
	WILL NOT OCCUR		

SECTION VII — SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED
WASTE DISPOSAL METHOD

SECTION VIII — SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION *(Specify type)*		
VENTILATION	LOCAL EXHAUST	SPECIAL
	MECHANICAL *(General)*	OTHER
PROTECTIVE GLOVES	EYE PROTECTION	
OTHER PROTECTIVE EQUIPMENT		

SECTION IX — SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING
OTHER PRECAUTIONS

(FIGURE 1)

Form Approved
OMB No. 44-R1387

MATERIAL SAFETY DATA SHEET

TYPE OF DATA SHEET
NEW   REVISED

IF REVISED, Section No. ____

SECTION I - GENERAL INFORMATION

MANUFACTURER'S NAME	FSCM/FSCNM	CONTRACT NUMBER OR ORDER NUMBER
MANUFACTURER'S ADDRESS (Number, Street, City, State, and ZIP Code)	PART NUMBER, PRODUCT AND/OR TRADE NAME	
NATIONAL STOCK NUMBER, ACTIVITY CONTROL NUMBER, OR LOCAL STOCK NUMBER	HAZARDOUS MATERIAL YES NO	SPECIFICATION
TYPE, GRADE AND/OR CLASS	NRC LICENSE NUMBER	EPA REGISTRATION NUMBER
CHEMICAL NAME AND SYNONYMS	CHEMICAL FAMILY	FORMULA
TYPED OR PRINTED NAME OF COMPANY POINT OF CONTACT	SIGNATURE	EMERGENCY TELEPHONE NUMBER / DATE

SECTION II - COMPOSITION

NIOSH NUMBER	CHEMICAL NAME (Ingredients)	%	TLV

SECTION III - PHYSICAL PROPERTIES

BOILING POINT (°F & °C)		CRITICAL TEMP (°F & °C)		SOLUBILITY IN WATER	
SPECIFIC GRAVITY (H_2O = 1)		VISCOSITY		AUTOIGNITION TEMP (°F & °C)	
EVAPORATION RATE (= 1)		VAPOR PRESSURE (MM HG)		CRITICAL PRESSURE	
DECOMPOSITION TEMP (°F & °C)		PERCENT VOLATILE BY VOLUME (%)		CORROSION RATE (Temp) (Material Ref)	
VAPOR DENSITY (Air = 1)		pH		APPEARANCE AND ODOR	
FREEZING (Melting) POINT (°F & °C)		MAGNETISM (Milligauss)			

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method Used)	FLAMMABLE (Explosive) LIMITS LEL	UEL
EXTINGUISHING MEDIA		
SPECIAL FIRE FIGHTING PROCEDURES AND EQUIPMENT		
UNUSUAL FIRE AND EXPLOSION HAZARDS		

- figure 2   Alternate Form A

SECTION V - HEALTH HAZARD DATA

EFFECTS OF ACUTE AND CHRONIC OVEREXPOSURE

EMERGENCY AND FIRST AID PROCEDURES

SECTION VI - REACTIVITY DATA

STABILITY
☐ UNSTABLE
☐ STABLE

CONDITIONS TO AVOID (Stability)

INCOMPATABILITY (Materials to avoid)

HAZARDOUS DECOMPOSITION PRODUCTS

HAZARDOUS POLYMERIZATION
☐ MAY OCCUR
☐ WILL NOT OCCUR

CONDITIONS TO AVOID (Polymerization)

SECTION VII - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE HANDLING AND DISPOSAL METHOD

NEUTRALIZING AGENT

SECTION VIII - OCCUPATIONAL PROTECTIVE MEASURES

RESPIRATORY PROTECTION (Specify type)

VENTILATION (specify type)

PROTECTIVE GLOVES (specify type)	EYE PROTECTION (specify type)	OTHER PERSONAL PROTECTIVE EQUIPMENT (specify type)

SECTION IX - SPECIAL PRECAUTIONS

HANDLING AND STORAGE PRECAUTIONS

OTHER PRECAUTIONS

SECTION X - TRANSPORTATION

APPLICABLE REGULATIONS
☐ 49 CFR ☐ IMCO ☐ TARIFF 6D ☐ I-TA ☐ MILITARY AIR (AFR 71-4)

SHIPPING NAME	ID NUMBER	REPORT QTY

HAZARD CLASS	LABELS

UNIT CONTAINER	DOT SPSL CONTAINER	DOT EXEMPT DOD CCN	LIMITED QTY

AEROSOL PROPELLANT(S)	NET EXPL WT